



Implicit or Explicit:

Understanding the role of Information Technology in Co-Creational Workshop Results

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Abstract

The demand for increased efficiency and patient-centered care has been influencing the development of healthcare in Sweden, and information technology has an important role in that process. Developing and implementing systems for public healthcare have proven to be a great challenge. One way to address this challenge is open innovation and co-creation. While there are a lot of studies focusing on innovation processes, there is little research regarding how technology is presented in the results. We have studied a co-creational workshop that focused on putting new perspectives on the use of information technology in healthcare. The workshop resulted in eight concepts which have been analyzed in terms of how technology is expressed. The results were categorized into implicit and explicit use of technology and this categorization indicates that the implicit use of technology is of the bricolage kind. By being both implicit and bricolage-like, the concepts hold qualities that make them more likely to be integrated into existing workplaces.

Keywords: Co-creation, innovation, healthcare

1. Introduction and Research Question

1.1 Introduction

This thesis settles within the context of Swedish public healthcare as a part of the growing digitalization of our society. Public healthcare in Sweden, as in many other countries, faces great challenges such as an aging population driving bigger costs for care (Carone, 2011). Information technology is considered one way of addressing some of these challenges, providing tools for efficiency, communication and so forth (Kwankam, 2004). Together with society as a whole, public healthcare institutions are becoming more and more digitized.

Unfortunately the growing amount of information technology systems and tools in public healthcare does not seem to solve all challenges. Critique is coming both from within public healthcare and from researchers is questioning how digital technology is used and how it affects healthcare processes (Lindahl et al, 2013; Nordin, 2014; Scandurra, 2013; Thornblad, 2014). Looking in to the critique there is a disturbing sense that information technology is adding to the sectors problems and challenges rather than solving them. Still, digital technology holds qualities that may be part of meaningful, and long-term, solutions for public healthcare. There is however an urgency to address the critique coming from within public healthcare, from people and practitioners that are affected by failing digital solutions on everyday basis. Healthcare is all about caring for people in need and a sustainable change for the future needs to focus more on actual healthcare practice so that the introduced information technology does not give negative consequences for these processes.

One key concern in the critique of the current use of information technology in public healthcare revolves around the lack of user involvement when systems are purchased and implemented. We see this as a valid and important critique and it can also be expanded to involve even more stakeholders. Based on the earlier mentioned importance of sustaining

functional practice within the organizations it is also important to care for all parts of what makes healthcare practice work. This includes practitioners, patients, politicians, citizens and many more.

There are many examples of attempts to address these concerns by different methods for involving stakeholders in the process of designing and innovating new digital tools and systems for public healthcare (Sanandaji, 2012). Our study is focusing on one of these attempts, driven by an innovation facilitator in the county council of Västerbotten, Sweden. The project runs a series of co-creational workshop activities gathering stakeholders representing different parts of the society and engages them in an innovation process that addresses the challenges of public healthcare. One of the aims is to take functional work practices in consideration.

The process of one of these workshops, held in spring 2013, where studied by Ericsson and Granquist (2013). They showed several strengths with this approach, especially in gathering innovation around key problem areas within the public healthcare sector. The openness of the process and wide mix of participants are key elements for success. One interesting reflection in their study was that this kind of process tends to shift focus away from artifacts and specific technologies. Digital technology is part of the concepts produced but was rarely occupying the participants discussions for long periods during the design process. The authors did not elaborate further about technology's role in this process but clearly opened a trajectory for exploration

1.2 Research Question

The aforementioned challenges in public healthcare, and in the space opened up by previous research, forms the basis of this thesis and our research question derives from an interest in the results of these workshops held in Västerbotten. We want to explore these results and how information technology is expressed in them. Based on this we have formed the following research question:

- What role does information technology take in the design concepts produced in a co-creational workshop?

Our aim is to find out how technology becomes part of the produced design concepts and also find a theoretical framework for describing this technology involvement. We hope to be able to provide a meaningful way of understanding this kind of design concepts while also keeping work practices in focus.

2. Related Research

This section presents the literature review based on the related research in the field of innovation strategies, healthcare and involving the user in the design process. Since, to our knowledge, there are no studies regarding how technology is expressed in the results from an innovation process, the related research is focusing on innovation and healthcare to give a platform for the design process and how user involvement can affect the outcome.

The first part presents information technology in healthcare. The second part focuses on innovation strategies such as open innovation and user involvement. The last part focuses on involving the user in the process of innovation in healthcare and how that might affect the results.

2.1 Information Technology in Healthcare

The demand for improving efficiency and patient care has increased in recent years. According to Thakur et al. (2012), innovation in healthcare is about improving communication, ensuring the quality and efficiency of the work processes, enabling the practitioners to focus on the patient. The role of information technology in healthcare has become more important due to “its potential to increase efficiency, accuracy, and accessibility of information” (André et al., 2008:754). Dal Molin (2011) argues that the use of information communication technology (ICT) is imperative in order to reduce costs and improve the quality of healthcare.

The Ministry of Health and Social Affairs in Sweden has launched the National E-Health, which is a strategy that focuses on creating a functional information flow between different healthcare actors.

With the help of integrated, user-friendly ICT support, information can be presented and transferred more securely and more efficiently and ensure coordinated action throughout the entire health and social care sector. (Ministry of Health and Social Affairs, 2011)

The use of information technology in healthcare has become a natural part of the development of healthcare (Ministry of Health and Social Affairs, 2011). According to Frimpong et al. (2013), IT in healthcare can improve the quality of care by for instance increasing the efficiency. The importance of collaboration cross-boundary is another part of the process. The Ministry of Health and Social Affairs (2011) argue that people’s health is not just the physical and mental, it is also the social parts of their lives, which means that different authorities have to collaborate in order to give the citizens the best possible care. This demands ICT that can support such collaborations.

2.2 Innovation Strategies

When designing an innovation process, there are several strategies that can be useful for creating something new. This section presents a few of those strategies that are relevant for this study. The first part presents the strategy of open innovation. The second part focuses on the user involvement in the design process.

2.2.2 Open Innovation

When the landscape of business changes, organizations have had to adjust their innovation processes (Remneland, 2010). Instead of closing the door, organizations are now inviting outside actors to be a part of the process, they use open innovation. It is unrealistic for an organization to believe that it can possess all the knowledge needed and according to Chesbrough (2003:41) “[u]seful knowledge has become widespread and ideas must be used with alacrity” otherwise they will be lost. The core of open innovation is to widen the range of sources of knowledge, using as many actors as possible, including costumers, other firms, academia etcetera (West & Gallagher, 2006). The strength of open innovation is that organizations can access knowledge outside their own walls, which gives them more opportunities since they are not held back by their own technology and knowledge (Chesbrough, 2003). The concept of open innovation is to bring outside knowledge inside, inside knowledge outside or coupling processes (Gassmann and Enkel, 2004).

Open innovation means that the company needs to open up its solid boundaries to let valuable knowledge flow in from the outside in order to create opportunities for co-operative innovation processes with partners, costumers and/or suppliers. It also includes the exploitation of ideas and IP [intellectual property] in order to bring them to market faster than competitors can. (Gassmann and Enkel, 2004:2)

It is about using both external and internal resources to develop new strategies and products, about changing the ways intellectual properties are managed, used and employed (West and Gallagher, 2006). According to Gassmann and Enkel (2004), the inclusion of customers and suppliers in the process will add knowledge and competence which is needed for product development.

According to Bullinger et al. (2012) open innovation can be an efficient way to get exciting innovations and get the acceptance of the users. They found it interesting that the involvement of the public in healthcare has not been discussed through the perspective of open innovation, and they “argue that principles of open innovation can and should be transferred to health care to better understand the innovative potential of public integration” (Bullinger et al., 2012:166).

2.2.3 Involving the User

To involve the users in the design process has been part of HCI for a long period of time were UCD (User-centered design) is one important method, or rather, a design philosophy (Sharp et al, 2007:425). The foundation for this approach is that “[...] real users and their goals, not technology, should be the driving force behind development of a product.” (ibid). UCD takes great concern in the user and the users practice mainly through studying users in their work and doing thorough empirical studies.

In participatory Design (PD) users get even more involved than in UCD. It is described as “[...] a set of theories, practices and studies related to end-users as full participants in activities leading to software and hardware computer products and computer-based activities.” (Muller & Druin, 2002). Getting the users to be part of the design process is a core

idea of PD as well as gathering users with various skills and experiences. Workshops are often used as a tool for design work.

This user-focus within HCI can be clearly linked to the ongoing work in healthcare as the focus within healthcare has become more and more patient-centered, more about listening to the patients when redesigning the healthcare processes (Bate and Robert, 2006). Involving the patients and the caregivers in the process of improving the healthcare gives a better result since patients and caregivers are playing an important part in the healthcare process, working and using it on daily basis (Bate and Robert, 2006). When the participants are invited to share all kinds of experience it will lead to “discovery and understanding of latent needs” (Kristensson et al., 2008:488)

Poetz and Schreier (2012) and Kristensson et al. (2004) found that the users were more innovative than the professionals when it came to the novelty of ideas. Also, the ideas of the professionals were not as beneficial for the customer as the ideas of the users were.

A viable solution to a novel problem does not originate in a vacuum. In order for people to make new and valuable connections, it is necessary to meet and to receive new and unknown information and thereby to create new knowledge. Consequently, the larger the set of skills, information and knowledge at hand, the more numerous are the alternatives available for producing something new. (Kristensson et al., 2004:6)

This indicates that involving a wider range of users will give a wider range of ideas in an innovation process, resulting in solutions that might differ from when the development team would have consisted of professionals only, technicians only and so on.

Bogers et al. (2010:872) found in their literature study that the user is often the source of innovation, that the “rapid pace of technology change, globalization, and increasing user sophistication means” will give the users more opportunities to be innovative and make contribution to the development. According to Remneland (2010) the users have gone from being a consumer into co-producer or prosumer (consumer + producer) by giving the producers feedback and thereby have the opportunity to change the product. The literature study conducted by Kujala (2003:11) shows that including not only is useful, it also “has positive effects on both systems success and user satisfaction”.

The way to design products is moving closer and closer to the user, being user-centered design (user as object) and participatory design (user as partner) (Sanders & Stappers, 2008). According to Sanders and Stappers (2008), these two approaches have been influencing each other, leading to co-creations and co-design. Co-creation means that the creation is shared by two or more people while co-design is a when a group of people are working together in a design development process, i.e. “co-design is a specific instance of co-creation” (Sanders and Stappers, 2008:6).

Experience-based design (EBD) is a process “with the goal of making user experience accessible to the designers, to allow them to conceive of designing experiences rather than services” (Bate and Robert, 2006:308). According to Pickles et al. (2008:52), EBD has the possibility to “redesign service with patients”. Even though the involvement of patients has been important when redesigning healthcare processes (Bate and Robert, 2006), Bessant and

Maier (2009) did not find many examples where the patients and staff worked together and were equally involved in the co-design process. They argue that the range of people in an experience-based design process gives an “unusual mix of expertise in the context of traditional health care improvement efforts” (Bessant and Maier, 2009:561). If a wider range of people are involved in the innovation process, the results might add something new to the field (Poetz and Schreier, 2012).

2.3 Citizen-Involved Innovation in Healthcare

As mentioned before, ICT is a big part of the innovations in healthcare. This might hinder the process of innovating new practices and products, since the focus might be on what can be done, regarding finances and technological capabilities (Ericsson and Granquist, 2013).

According to Ericsson and Granquist (2013), a co-creational innovation process can take a step back from focusing on the capacity of the technology, enabling the participants to focus on the problems instead. They suggest that one solution could be to “design beyond the artifact” (Ericsson and Granquist, 2013:26), which means, not focusing on the technology and instead focus on what should be done.

Boyd et al. (2012) argue for the use of co-design to improve the patient experiences and the overall services in healthcare. Their project resulted in a list of eight improvements, none of which is explicitly expressing the technological requirements or obstacles. This shows that when the group of participants expands to include non-professionals, the results will be more innovative since the focus is not on the possibilities and constraints of the existing technology and work practices, and instead the focus is on solving the problem.

The “ordinary users” in the study conducted by Kristensson et al. (2004) came up with more original ideas regarding mobile phone services than the professional developers. They claim that this is because the users did not have any prior knowledge of what could be done with the existing technology. They were not blocked by the technological possibilities and therefore their ideas were not strangled by technical regulations. While the “ordinary users” came up with the most original service ideas, the professionals came up with the most realizable ideas. This indicates that the collaboration between the two could produce ideas that are original as well as realizable.

3. Theoretical Framing

This section presents the theoretical framework used for analyzing the concepts from the workshop. The first section is about how technology is affecting work practices. This is followed by presenting the concept of bricolage as a way to explain innovation. In the last section we elaborate on the previous sections and discuss how technology can be understood as a resource.

3.1 Technology Relations Affecting Work Practice

The use of information technology in public healthcare is just one small part of the growing digitalization of our society. Together with its users, digital technology forms a whole which can be understood as a system where the different system components work together to achieve a joint objective (Churchman, 1968). The system view helps us understand that all components relate to each other in one way or the other, and also relate to other systems. This is a tool in understanding complexity and by pointing out the importance of relations it also poses the question of the significance of the relations. What we explicitly want to highlight is the importance of understanding the relations between humans and technology. In this notion technology is distinctly separated from the idea that it is mere passive things only acting as they were intended and designed to do. Peter-Paul Verbeek (2005:43) concludes:

[...] a philosophy of technology begins by emphasizing that technology is not neutral, noting that technologies do much more than simply achieve goals for which they were instituted. The new possibilities that technologies open up always change the context in which they play a role.

Don Ihde (1990) has developed a framework which defines different kinds of human-technology relations and how they, in different ways, affect our interpretation of the world. This means that information technology holds different significance depending on what people do and how they related to the specific technology (Croon Fors, 2006:227). It has been used to show how a learning platform, that in first appearance might seem like a distinct digital object with only one essential meaning, in fact is interpreted differently depending on different user's relation to it (Schimmer, 2012).

This theoretical work puts emphasis on the importance of understanding our relations to technology and how it can shift depending on the users and/or technology. It suggests that putting new digital technology into a context always will affect people's interpretation of the world, or in this case their work practice context. It also makes clear that people form different relationships and therefore possibly different interpretations of the context which also might affect the work practice.

Olesen and Markussen (2003), building on the same theoretical framework, further contributes to this understanding when they describe new technologies impact on actual work practice. They show how the work practice of a seemingly simple task as writing to a prescription is substantially altered going from the traditional paper form to a digital one. E.g. working with a digital interface makes the assumption that the user is familiar with basic computational activities such as "open the record" in the system. This does not resemble

much of the old-school process of picking up the record from the physical file. Olesen and Markussen (2003:365) describe a digital prescription system where a “[...] conflict between personal experience and the textuality offered” surfaced when one physician realized that a certain medicine was not included in the database which makes it impossible to put on a prescription. This would not have occurred in a traditional paper form as it allows the physician to write down whatever medicine he or she wants to.

This shows how technology has a substantial effect on work practice and how practice is forced to change as a consequence of technology being implemented. This opens questions about how we can take work practices in consideration when we are adopting new information technology.

3.2 Bricolage

Bricolage is originally a concept introduced by Claude Levi-Strauss (1966) describing how people ‘making do with whatever is at hand’. It “[...] implies a process of creating something new out of the resources available. Institutions are molded through a process of *bricolage* whereby an individual in an institution uses the ideas and philosophies already at work in that institution to transform it.” (Aagard, 2009). This is a way of problem solving working directly with the problem at hand together with the resources available at hand. Thus the activities of the *bricoleur* is highly situated working with the challenges and problems faced in the present practice.

Within organizations bricolage can be used to understand how its members can “make sense of and order the world ... against a background of material and social constraint” (Linstead and Grafton-Small, 1990:291). This creates an agility within an organization to deal with upcoming challenges and problems and to solve them with the resources available. Duymedjian and Rüling (2010:135) summarize:

In a crisis situation, the encounter with familiar objects and the capacity to perform simple actions can allow actors to retain their orientation but also to immediately engage in the process of trial and error, so that the ability to act does not become paralyzed.

As a concept, or maybe rather a skill, bricolage holds the promise of coping with situated problems and challenges in a way that stays close to the original work practice in the organization. This kind of change, from within the practice, also differentiates from change coming from outside the practice such as systems or tools imposed by management or another external actor. A bricolage originates from the problem or challenge faced, the involved actors and their ability to change it by gathering resources known to them. Systems coming from outside on the other hand can conflict with existing practices being too focused on singled out functions aiming at solving specific problems.

3.3 Technology as Resource

In a bricolage all kinds of tools and resources at hand are used in the aim for improvement. There is an immediate presence of the technology transferred into to these assemblies making it well connected to the context and practice it originated from. This makes the

technology in itself more entangled with the work practice and less visible as a pivot point for the change. It is a contrast to the more common, or at least more noticeable, way of merging technology into a context as a system or specific tool placed into a practice with the intention to create change.

Considering the differences between change deriving from bricolage and change from adding technology it might be useful to elaborate on a common metaphor for technology - as a tool – which is often used in these different situations. The tool metaphor is normally understood as “a handheld device that aids in accomplishing a task” (Merriam-Webster) or, similarly, “A device or implement, especially one held in the hand, used to carry out a particular function” (Oxford dictionaries). This notion does not imply the gathering or tinkering activities that distinguish a bricolage use of technology, instead it is rather well suited to the activity of adding technology into contexts and practices.

The use of technology in bricolage might instead be understood as gathering of a resource. In this sense technology becomes one of many resources at hand for the *bricoleur*. A similar notion has been adopted by Bannon and Kaptelinin (2012) as they argue for a move away from focusing on artifacts in interaction design in favor for “Technology-Enhanced Activity Spaces” where users are empowered to help “themselves create better environments for their work, learning, and leisure activities”. This might be a promising route for meeting challenges with IT in public healthcare. The importance of caring for the situatedness is noted by Finn Olesen (2006:244) saying: “[...] concern for the situated character of everyday work thus seem necessary if future design of standardized technologies are to be a true improvement of health-care work.”.

4. Methodology

According to Holme and Solvang (1997), a method is a tool for solving problems and creating new knowledge. It is of utmost importance to choose the method that best corresponds to the aim of the study. This study is focusing on how technology is expressed in the results of a workshop, it is not about generalizing and therefore a qualitative method is preferable since that kind of study enables the researcher to get a deeper understanding of a phenomenon (Holme and Solvang, 1997). To be able to answer the research question, concepts gathered from the workshop were studied.

This section contains a presentation of the method used during the research process. In the first part the case is presented. The following part focuses on the ethical considerations in this study. The next part presents the data analysis and the process of structuring the material. Finally, the limitations and critiques regarding the methods are presented.

4.1 Case Description

The data for this study consists of material gathered from a co-creational innovative workshop held in Umeå in April, 2014. This workshop had the theme “Innovative collaboration for the future” and about fifty people had been invited by Innovationsslussen in Umeå and to participate in the workshop. The group consisted of students, politicians, people working in the public healthcare in Sweden, relatives and businesspeople. They all shared a will to participate in this workshop with the aim to improve the situation in public healthcare.

This was a one day workshop and the main result was eight concepts/ideas. The workshop lasted one day, starting at 9:00 AM, ending at 17:00 PM. There were eight groups (4-7 participants in each group) and consisted of a mix of people with different depths of experience in the healthcare sector. During that day, we were participating in different groups, taking part of the innovation process and the presentation of each concept which was presented at the end of the day. The day started with a brief presentation of the workshop theme and the aim for the work of the day. One of the process leaders summarized the day by saying:

We want to discuss how we can make best advantage of new technology as a support for collaboration and interaction in and between organizations and also in and between professions. It is supposed to improve and simplify, not make things more complicated. Today, we aim at reasonable solutions with the potential to amend everyday work now, rather than looking for futuristic visions.

This setup led into the actual workshop where the groups were encouraged to further discuss the theme of the day out of their own experiences and eventually come up with one, or more, suggestions for improvement. The initial work was very open ended and creative, the groups were given little guidance except from the summary of the day’s theme. There were a variety of tools for brainstorming such as Post-Its, chalkboards, different colored pens and more. Work became more structured as the day progressed and each group were asked to conclude their best idea and write the idea/concept down on an idea canvas, a pre-printed paper for documenting the concepts.

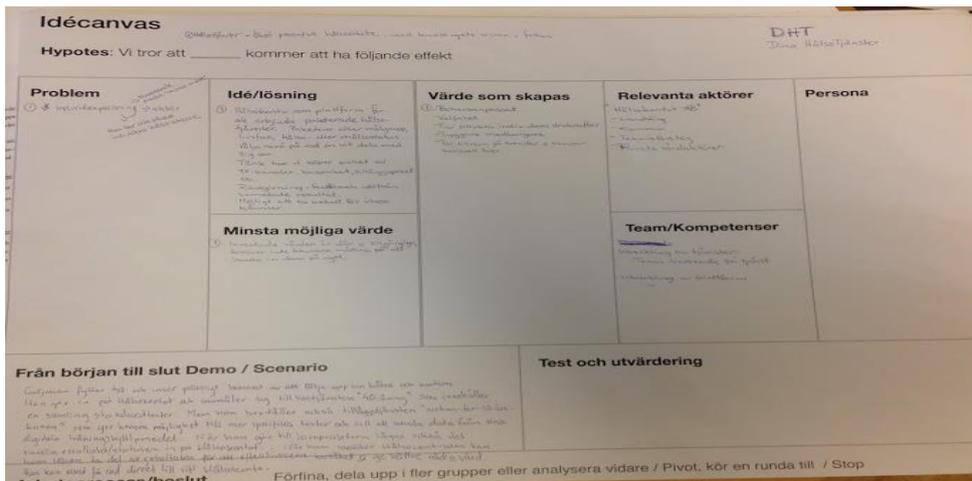


Figure 1. Idea Canvas My Health Account

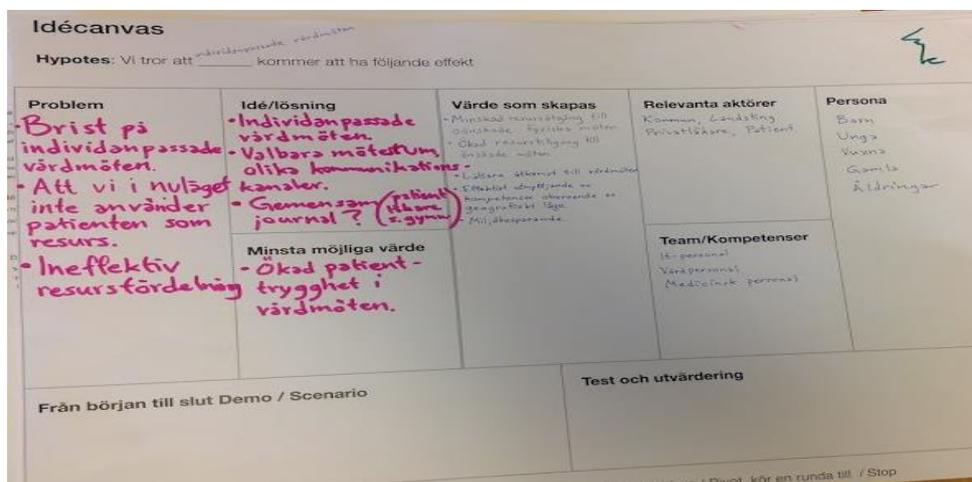


Figure 2. Idea Canvas Individual Health Meetings

The idea canvases included the following headlines;

- Problem
- Idea/Solution
- Value created
- The least possible value
- Relevant actors
- Team/Competencies
- Persona
- Demo/Scenario
- Testing and evaluation
- Work process/Decisions

Not all groups ended up filling out all headlines, though the key features of each concept were described.

They were also asked to illustrate their idea in one or more pictures which visually described their idea/concept, how it could and should be used. This was done on a storyboard.

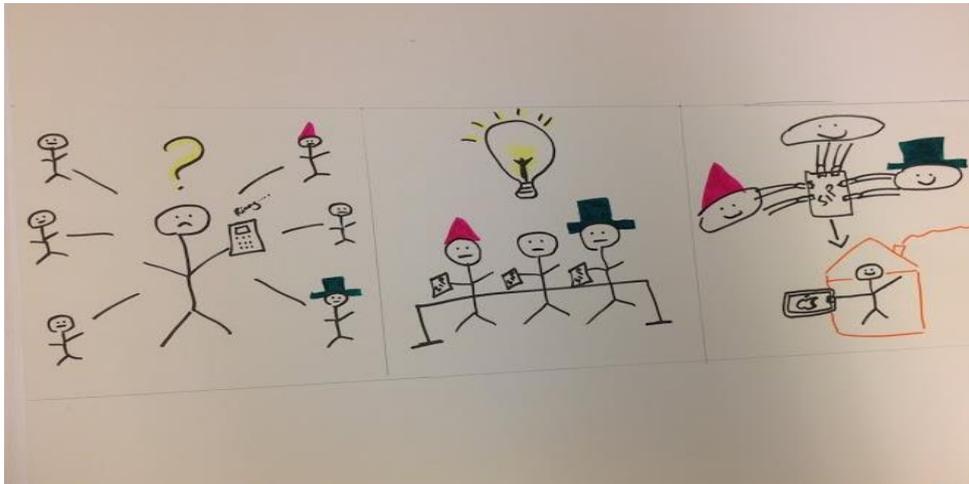


Figure 3. Storyboard SIP



Figure 4. Storyboard the Health Support Application

The workshop ended with short presentations, 30-60 seconds, where the groups briefed the other groups on the key concepts of their ideas, which was videotaped.

Our data consist mainly of these ideas as they were documented on the idea canvases. We also used the storyboards and the video recordings to clarify details in the idea canvases when information was scarce or unclear.

4.1.1 Other Workshop Activities

This particular workshop which we draw our data from is not one stand-alone activity but one among a series of workshops and other activities during the recent years and also upcoming events building on the result from the latest workshop. The first workshop of this kind was held in Umeå, 2012. It was a collaboration activity initiated by “Innovationsslussen, Region Västerbotten” together with the Department of Informatics, Umeå University. The theme for the workshop was “Forming the future healthcare” and involved a mix of

participants similar to the latest workshop. By using drama as a tool for describing problem areas in public healthcare, the participants together formed a number of concepts addressing different angles of the presented problem areas.

The workshop in 2012 was followed up by a similar workshop, also using drama as a catalyst for discussion and innovation, in Lycksele, spring 2013. Some of the concepts produced at this workshop were transferred to another activity in Lycksele held in the beginning of the summer. This, “Meeting place Lycksele”, progressed with the concepts through further collaborative design activity.

4.2 Ethical Considerations

When conducting a study involving people, the researcher always has to contemplate on how the study will affect the participants and if/what information is relevant for the study (Holme and Solvang, 1997). According to Vetenskapsrådet (2002), the anonymity of the participants has to be protected; they have to be informed of the study and they have to be in charge of their own participation. This study is a bit different from a study where people are being observed, since it focuses on the material that the groups produced during the workshop, not on how the participants acted in the environment. This means that no participant will be singled out, enabling the researchers to protect their anonymity. All participants signed a paper where they agreed on the material being used by others, resigned all ownership of the material and the workshop was voluntary. Thus the study fulfils the ethical demands posted by Vetenskapsrådet.

4.3 Data Analysis

In a qualitative study the material is structured and organized after it has been collected (Holme and Solvang, 1997). The main material gathered from the workshop was the idea canvases. They were first translated from Swedish into English and then transcribed, enabling easier categorization of the material. According to Hjerm and Lindgren (2010), the material should be roughly categorized to be reduced into themes, not only to structure the material but also to find the patterns most valuable to the study.

The first reading of the material was done without making any marks, this to gain an understanding for the totality of it. Thereafter we reread the text and the keywords were highlighted. Based on the keywords the material was categorized into two categories, explicit use of technology and implicit use of technology.

To get a better understanding of the concepts and how they were supposed to be used, the storyboards were studied. They were not transcribed but the explicit and implicit use of technology was used for categorization.

Finally, we studied the videos from the presentations to get an even deeper understanding of how the concepts were supposed to work.

4.4 Methodological Limitations and Critique

The best way to find out how people perceive their world is to talk to them, hence conducting an interview. By studying the material from the workshop, we did not have access to the thoughts of the participants, only the result of the innovation process. This is, however, not a

big limitation since we are studying how technology is expressed in the results from the workshop. Future research could focus on the thoughts of the participants in a similar innovation process to gain deeper understanding of the thoughts behind the role of technology.

Being a participant in the workshop could have had an effect on the other participants, making them behave differently (Holme and Solvang, 1997). The fact that we were not observing the behavior of the participants, but instead looking at the results of the workshops, minimizes the risk of interfering with the results. We did not take notes or behave like researchers, we were merely taking part in the innovation process, just like all the other participants. This minimized the risk of disturbing the participants in their innovation process and affecting them negatively.

One of the biggest critiques of qualitative studies is that they are not objective. When the researcher is aware of that, the risk of him or her being subjective is minimized (Bryman, 2011; Holme and Solvang, 1997). Because we were taking part in the innovation process, the reflection on our subjectivity has been crucial. We claim that this study benefitted from having two researchers collaborating. During the analytical process we discussed why we saw things the way we did, forcing us to reflect on our biases and thereby increasing the objectivity.

5. Results

This section will present the result from the gathered data¹. The results are based on the eight concepts created during the workshop. In the first part the concepts are presented, which problem they are targeting and the solution for it. The second part focuses on the implicit use of technology in the concepts and describes how the concepts are simplifying connections between different parties. In addition to that, it also presents how the concepts are suggesting unified platforms to create a better overall view of the data. The third part focuses on the explicit use of technology.

5.1. The Concepts

5.1.1 The Family Game (Familjespelet)

This is an application focusing on the physical and mental health of young children. The solution to inactivity among children is an interactive game where the family can support each other to change their lifestyle. There are different modules depending on the starting problem, could be smoking, overweight, stress etcetera. It contains challenges between families, coaching and a flow of tips and offers.

The least amount of value created with the game is being social with the family and becoming inspired to change habits. This will lead to healthier families, healthier workplaces, changes in attitudes and decreased costs for the society.

To be able to launch this, companies and children organizations will be needed as competencies. Also the counties, trade and industry, municipalities, academia, clubs, governments and schools are relevant actors.

5.1.2. The Health Account (Hälsokontot)

The problem addressed by this concept is that the health interests of the individual are not captured. The solution is an account offering packaged health services. The user can choose a package according to target group, health status etcetera and also how much he or she wants to share. The user gets advises and feedback based on the input data that they themselves upload and it is possible to charge the user for some of the services, which can be compared with how users can choose channel-package according to preferences.

Since the data uploaded by the citizen is available online, the meetings with the physician will not have to include gathering the data again which will be time saving and makes the meeting more efficient.

The *Health Account* creates value since it will be based on the citizens' needs and they will have the ability to choose. It will take advantage of the citizens' own capacities and interest in their own health. By using the *Health Account*, the citizens will feel more in control.

The actors needed for this concept are; The *Health Account* Ltd, counties, municipalities, technological companies, private caregivers. Depending on which service, different teams will be needed to develop them.

¹ All data material used in the thesis have been translated from Swedish to English by the authors. The names on the concepts presented has also been translated and the English names will be used throughout the thesis.

5.1.3. The Health Support Application (Hälsostödsappen)

The application is focusing on solving the medical problems that can arise when dealing with homecare. The homecare staff might lack the medical knowledge but they might be the only one in place to perform the medical tests on the caretaker. The application enables the homecare staff to conduct minor examinations, such as blood pressure, and send it to the nurse if needed. By using the application, the homecare staff will be equipped with a “mobile examination room”. It also enables the homecare staff to place an order for the consumables such as soap and diapers.

The *Health Support Application* will use GPS in order for the application to know which caretaker the homecare staff is visiting. This will simplify the work since the homecare staff will automatically have access to the information needed when visiting the caretaker. It can also be used to keep track of the location of the home care staff, in case one might need help, he or she can look in the application to see if there is any colleagues close by.

The application will increase the security for the homecare staff as well as for the caretaker. It will increase the quality of care by giving the homecare staff the tools needed to conduct a minor examination. It enables quality secured documentation in the home of the caretaker and it will save time, both for the nurse and the caretaker, and in the case of the caretaker needing to go to the hospital, the application will have saved precious time since the nurse does not have to go there first to conduct the tests. He or she can get the information sent via the application and can make the decision based on that.

The relevant actors for this application are the unit manager, the homecare staff, the nurse, the patient and relatives. To be able to develop this the team has to consist of; the homecare staff, the nurse, a programmer, a designer and the patients and/or patient organizations.

5.1.4. My Health (Mitt hälsoläge)

This concept is targeting the problem of making the information of the citizen available to all stakeholders (in Sweden, the municipalities are handling some parts of the healthcare while the counties are handling others). The citizens are not in charge of the information regarding their health. The solution is a web-based platform where both the citizen and the physician can add data. This creates a better overall picture and the documentation will be updated continuously. It uses languages that the citizen will understand (both regarding the native language but also technical language) and it visualizes the information. Also, a two-way-communication is possible.

This will enable the citizens to be aware of their health status. There would be better communication between the citizens and authorities and between different authorities (e.g. county council and municipality). It will make the citizen more motivated and committed and save time for all parties involved. It will be a collected view of the citizen’s health status and the information will be updated since both the physician and the citizen will be able to add data, and both of them will be alerted when there is a deviation.

The relevant actors for *My Health* are citizens and caregivers. To be able to develop this, healthcare personnel, healthcare developers, technicians and lawyers have to be a part of the process.

5.1.5. Individual Health Meetings (Individianpassade vårdmöten)

To solve the problem of not having individualized health meetings, this solution aims at creating more options for the citizen. The citizen can choose where to meet, in real life or online, different channels for communication etcetera. It gives room for a common journal for patient, physician and physiotherapists for instance.

This will decrease the resources spent on unwanted physical meetings, which in turn will increase the resources for wanted physical meetings. It will give easy-access to the care-meetings. It is an efficient way of utilizing competencies, regardless of the geographic location which will also be environmentally friendly.

The actors necessary for this concept are the municipalities, the county council of Västerbotten, private physicians and the patients. It would require the competence of technicians, healthcare and medical personnel.

5.1.6. PVG

The issue being addressed here is the problem of not knowing where to turn when needing help or information regarding the healthcare. It is a personal healthcare guide, someone the citizen can turn to, regardless of the problem. The *PVG* will then help the citizen within twenty-four hours.

This will save time, release capacity and make the citizens more assured since they would have their own “personal health guide”, giving them only one forum to visit instead of having to look around.

The concept will have to include the counties and other actors regarding healthcare. It also requires technological knowledge, focus groups and finances.

5.1.7. Speech Journal (Taljournal)

Writing in the patient-journal is time-consuming and the *Speech Journal* aims at minimizing the written journal for the physicians and nurses working in healthcare. The solution is a speech journal enabling automated documentation, automated text generator, manual corrections, manual signing. It can also generate text and speech.

It will decrease the informal channels for information. There will be less “running around”, less risk of infections and less time in front of the screen or documenting, which will give the citizen a better experience regarding the service since the physicians will have more time for face-to-face contacts.

The relevant actors for this concept are all personnel in healthcare, developers, investors, the ministry of welfare, EU etcetera. To be able to develop it there has to be a product development, system development for the voice recognition, developers for text generators/algorithms, a documentation unit and lawyers.

5.1.8. SIP

The problem being addressed here is the lack of a common space for the different stakeholders regarding healthcare. When a citizen needs something, he or she can be faced with several different authorities, such as the municipality, the County Councils, Social Services etcetera, before their case will be handled. *SIP* is a digitalized “common space” for the citizens and concerned authorities within healthcare.

This will pay attention to problems and minimizing the risk of the patient ending up in between two different authorities. It will increase the efficiency, create an alternative communication channel and secure the quality of care for the citizen. The *SIP* will be known to the citizen since he or she is be the owner of the data.

The relevant actors and teams needed for this concept are the patient, technicians and politicians.

6. Data analysis

The data from the idea canvases, storyboards, pictures and videos from the workshops were analyzed and categorized into implicit and explicit expressions of technology in the results. This section presents the analysis of that material and the first part focuses on the implicit use of technology, presenting which concepts that are implicitly expressing technology, while the second part focuses on the explicit use and the concepts related to it.

6.1. Implicit Technology

The focus for some of the concepts is on the process, not the tool, and the different activities involved in that process. They are not explicitly describing how the technology is supposed to be used, hence the use of technology is made implicit. In this section, the implicit expression of technology is presented, in which concepts, giving examples on how it is expressed.

6.1.1. Simplifying the Contact

The *Family Game*, *Health Account*, *Individual Health Meetings*, *PVG* and *SIP* all focus on simplifying the connections between the citizens, the healthcare and other authorities. The aim is to minimize the steps to make contact or finding the right data as few as possible. The purpose of the *Health Support Application* is also to simplify the contact between the home caregivers and the nurses but it is not aiming at simplifying the connections between the citizens, healthcare and other authorities.

The *Family Game* creates easily accessible ways for young citizens to get the support they need to be able to make a change in their lives, changes such as stop smoking, lose weight etcetera. They will have access to coaching which will be provided by the healthcare, and also tips and offers to help the young citizens to become healthier.

PVG is creating personalized platform for the citizens, where they have their personal guide who helps them to find the right care. This minimizes the effort the citizen has to make to find the relevant information.

The *Health Account* gives the citizens the opportunity to create their own individual *Health Account* “packaged according to target group, life stage, health or health status” and the citizens get to choose at which level they want to share their information. The citizen supplies the data which can be accessed by the physician. Since the data already is there, the physician can focus on other things rather than collecting the data. The feedback and guidance will be based on the input data supplied by the citizen.

Individual Health Meetings will enable the individualization of the meetings regarding the citizen’s health. The citizen will be able to choose which kind of meeting she would like to have with e.g. the physician, digital meeting or physical meeting. This will make the access to the healthcare easier since it is not depending on the citizen’s capability of attending a physical meeting.

The *SIP* is aiming to simplify the citizen’s contact with different authorities regarding his or her wellbeing. Instead of making the citizen have to contact different instances, there will be a common space for the citizen and the authorities, a “coordination for the individual”, simplifying the interactions between the different parties, simplification by unifying the platform.

The *SIP*, *My Health*, the *Family Game*, the *Health Account*, *Individual Health Meetings* and *PVG* all aim at simplifying the interactions between the citizens and the authorities. The *Health Support Application* and the *Speech Journal* are also aiming at simplifying, but they are more focused on simplifying the work for the caregivers.

6.1.2. Unifying Platforms

The *Health Account*, *My Health* and *SIP* focus on creating a platform where the information of the citizen will be easily accessible for all parties, including the citizen. All data about the citizen will be gathered on the platform, the citizen being in charge of what they want to share. The *Health Account* and *My Health* will empower the citizens and enabling them to add data into their journals, data such as blood pressure and weight. This will also be time saving when the citizen visits the hospital or doctor, since the tests are already done, the physician can focus on other parts of the meeting.

The *Health Account* gathers both information about the citizen's health and other features regarding health, such as exercise, giving the citizen the possibility to choose a package.

Eric turns forty and suddenly realizes the need to follow up his health and exercise. He enters the Health Account and signs up for a collection of basic tests. But he also order the additional service 'exercise-for-midlife-crisis' that gives him the opportunity to get more specific tests and to be able to gather data from his digital training aids. (Scenario from the Health Account)

This enables the citizen to collect both the medical data and the training data, giving a better overall picture for the physician who will be able to access all the data.

My Health is, as mentioned before, also aiming at making the data more accessible by gathering all data in one place, creating a common space. The concept is not only looking at gathering information about the citizen's health, but enhancing "the communication between citizen and authority and between different authorities". By having a common space such as a conjoint platform gives a better overall picture of the health status as well as it is timesaving for all parties.

The citizen has a stroke [...] contacts the occupational therapist in the municipality, via My Health, to get help with home modifications. The citizen gets information about what kind of documentation the occupational therapist needs to make a decision. The citizen sends the relevant data from the journal and films the house. The occupational therapist asks for permission to send the videotape to the property management. (Scenario from My Health)

The process is done without the occupational therapist having to go to the citizen's home, saving time making the process more efficient.

As mentioned earlier, *SIP* is focusing on solving the problem of the citizen having to contact several different authorities. By only having one platform for the information about the user, the accessibility will increase. The citizen is the owner of the information and can decide on who gets access to the information, with whom to share the information.

By unifying the platform, the contact between the citizens and the authorities will be simplified.

6.2. Explicit Technology

The following section will present the concepts that are making explicit use of the technology. Unlike the previous section, the concepts presented here have a concrete description of how technology is supposed to be used.

6.2.1. Simplify the Care Work

The *Health Support Application* is, as mentioned before, also aiming at simplifying the connections. It is not, however, involving the citizen. It is a pure simplification of the communication between the home caregivers and the nurses to enable fast decisions and security for the caretaker.

The home caregiver visits Agda in Myrberg. At the time of the visit, Agda seems to be a bit under the weather and the home caregiver therefore uses the Health Support Application that helps him/her to identify which measurements the nurse will need. The data is sent to the nurse and the nurse decides on which actions to take. Winnings: time-to-decision, the nurse does not have to go to Agda [saving time], the home caregiver can stay with Agda until the ambulance arrives. (Scenario from the Health Support Application)

The concept creates an opportunity for collaboration between the home caregiver and the nurse without them having to physically be in the same room. It is done via a smartphone equipped with GPS and the application. By bringing the smartphone, the home caregiver creates a mobile ward.

The *Speech Journal* is also simplifying the work practices for people working within healthcare. The *Speech Journal* will be a device that can handle voice recognition, automated text generator that also has room for manually performed activities. By simplifying the work practice the *Speech Journal* aims at making work more efficient.

There is an increasing demand the care units of the Swedish healthcare to be time-efficient. We then have to ask ourselves the question; what do we need to make more efficient? Is it time-efficient to sit at a desk and manually type the data into the patient records? [...] In a time where the demands on patient security and documentation is increasing, will we then have the time for the desired physical meetings between the physician and the patient? (Idea canvas from the Speech Journal)

Both the Healthcare Application and the *Speech Journal* explicitly express the technology needed. They are, as well as the other concepts, aiming at simplifying the process, making it more efficient, but the focus is not on the contact with the citizen, rather on the work process.

7. Discussion

In the analysis of the results of the workshop we made a distinction between the concepts depending on how they related to technology. We found that in a majority (6) of the concepts technology played an implicit part of the whole, the use of technology to achieve the wanted change was only implied in the description. In the foreground were the work practices, process activities and connections needed to accomplish the intended change. Only in two of the concepts made use of technology in a way which we choose to label as explicit. In *The Speech Journal* the use of specific, and advanced, technology is clearly in the foreground. Likewise, *The Health Support Application*, uses technology as a pivot-point for change and is therefore labeled explicit.

7.1. Making Bricolage

To understand the role of information technology in the workshop results we used the notion of bricolage as a lens for understanding how the participants employed technology into their concepts. What we wanted to see was if the participants used information technology in a way similar to any other resource at hand.

We found that the implicit and explicit use of technology in the concepts were a good way of describing how situated the technology was. Taking *My Health* as an example it shows an innovative way of dealing with the problem of sharing health information between different care givers and government institutions. By giving the citizen's control over the data and the right to choose which other institution that is allowed to see it solves the problems with different journal systems that are not possible, or wanted, to be integrated. What is interesting in the sense of bricolage is the way information technology is used in this concept as the technology is not in the foreground of the solution. Instead it is more about connecting citizens, different public healthcare actors and governmental institutions in a meaningful way using a technology as one of the resources. They are not showing any novel innovative artifact full of new functions rather they adopt known uses of existing technology connecting it with people and their practices in a way the creates new meaning. We argue that this is a bricolage like way of using information technology as a resource making it very situated related to the practices it wants to change and improve.

In comparison the concepts which we found being explicit in their use of information technology employed technology in a different way. The most distinct example is the *Speech Journal* where a digital journal is connected to speech recognition technology to form a new artifact capable to take verbal journal notes. This gathering of technologies is first of all more explicit than in the previous example but it is also has less obvious connections to other resources situated in the known practice of taking journal notes.

Comparing the two there is a noticeable difference in how situated these concepts are in the practice of today. The *My Health* concept works from the known practice forming a suggestion for a new one by using known resources and uses of familiar technology in a way that takes into consideration what is already present. It is therefore an example of something that is close to the notion of bricolage. In the example of the *Speech Journal* we rather see a new innovative artifact or product forming from the known practice. It does not stay connected to its origin in the same way as the previous example.

Looking at all the concepts there seems to be a correlation between the implicit concepts and a bricolage-like way of using technology in the solutions. In opposite, the concepts labeled as explicit did not show the same bricolage-like use of technology as it becomes too separated from the original practice.

But what is then the value of bricolage solutions? First of all it is important to remind that these concepts are not true bricolages in the original sense as they automatically are not situated in the ongoing practice being results from a workshop. Some of them still show significant similarities to bricolages and by so staying close to its native practice. Finn Olesen (2006:244) states that “[...] concern for the situated character of everyday work thus seem necessary if future design of standardized technologies are to be a true improvement of health-care work.”

We argue that these bricolage-like concepts do stay close to the situatedness of everyday practice and also employs information technology in a way that is familiar to their uses. These concepts stay away from adding to the growing collection of new systems that, as shown in the introduction of the thesis, is part of the challenges public healthcare is faced with. It is also a noticeable step away from focusing on artifacts as discussed by Bannon and Kaptelinin (2012) suggesting a way for users to be in better control of the information technology in use and how it evolves.

7.2. Implicit and Explicit Technology - Differences in Target Groups

One interesting finding in labeling the concepts explicit or implicit was the discovery of which target groups that were in focus. The explicit concepts were clearly focusing on healthcare personnel, *The Speech Journal* giving caregivers a tool for taking journal notes and *The Health Support Application* works as a tool for communication between home caregivers and nurses, making the work more efficient and in the long run increase the quality of care, which is what technology can contribute with when implemented into healthcare (André et al. 2008; Dal Molin, 2011; Thakur et al., 2012) In opposite, the concepts labeled as implicit are all concerned with the linking different stakeholders together e.g. *My Health* provides a solution for challenges in information transfer between citizens and different caregivers.

A possible explanation for this difference might lie in the distinction between technology as tool and technology as resource. In the concepts noted as explicit the use of technology is clearly tool-like, aiming at using technology as a pivot-point for change. Looking at the concepts with implicit technology use the technology is only present as one of many other resources gathered to form a bricolage of change. We have no clear answer to why this difference appears and if it is consistent if compared to similar results (e.g. concepts from earlier workshops). This is an opening for further exploration trying to reveal if there is a true connection between the technology as tool notion and explicit use of technology in design concepts.

7.3 Workshop Outcome - Critique

The aim with this workshop, as well as previous ones, is to engage with the challenges of public healthcare in a new way, opening new perspectives and creating new connections. By

gathering a wide range of stakeholders, some with direct connections to healthcare practice and some less, the hope is to make use of a broad spectrum of experiences and ideas which is the core of open innovation (West and Gallagher, 2006). The involvement of participants with different background, not only caregivers and caretakers who have the knowledge of the healthcare system, but also people from other fields, might make the results from that process more innovative than if only professionals would have been involved (Bate and Robert, 2006; Kristensson et al., 2004; Kristensson et al., 2008; Poetz and Schreier, 2012). There is also a core idea in making change from within not by adding from the outside. But does the results from the workshop reflect these goals?

The results has shown that a majority of the concepts produced during the workshop holds qualities that stays close to the work practices making use of different resources, including information technology, in a way that can be understood as bricolage. By this they hold the potential to fit into existing working practices in a relatively smooth way as characterized by a bricolage. Despite this potential there is an obvious risk of being carried away by these results as the workshop by definition is clearly outside the real context and the actual work practice. Therefore the results cannot be described as a bricolage in an absolute sense only with resemblance. As the bricolage is not fully situated and origin from an immediate and present challenge or problem it also lacks the smoothness in which a bricolage normally is integrated into new work practice.

This discrepancy between the concepts produced by the workshop, bearing resemblance to bricolage, and bricolage in a true meaning working from within the practice, implies a great challenge in directing the knowledge and ideas produced at the workshop back to the actual practice. To achieve the goals this direction of ideas has to work smoothly to avoid the consequences and difficulties of practice transformation that normally follows an introduction of new technology (see Olesen and Markussen, 2003).

7.4. Implementing concepts into practice – possible consequences

There have already been a number of workshops like the one we use as basis for this study. Though these has been successful in terms of engagement from the participants and the production of innovative concepts, none of the concepts have still been tested in real practice. This makes it hard to draw conclusions about the quality of the concepts in the long run and their ability to be implemented smoothly into to working practice. There is mainly two routes for a concept to go from idea to practice; (1) by participants taking the ideas of the concepts back to their organization and use it to make change within their work practice and (2) by further developing the concepts through some design and/or innovation process.

In the first case the participants were encouraged to take the ideas and concepts generated by the workshop back to their workplaces and see if it could be used to improve their work. To evaluate if there been any successful implementations has to rely on some sort of feedback from the participants. This has not yet been conducted.

The second route can be exemplified by one of the concepts from a workshop held in Lycksele in spring 2013, called Hälsoavataren (Health Avatar^{2*}). This concept was further developed in later workshops and is now resulting in the founding of a company aiming at realizing the concept and making a sellable product of it.

This progress from idea to business shows evidence on the strong potential to abducting ideas from workshops of this kind with enough innovation uniqueness to make new products. But it also shows a deviation from the idea of keeping change close to the actual practice. In the making of a new product, even though it originates from a bricolage-like concept, does not differ from any other new artifact in terms of implementing it on an existing practice. It will become technology added from outside the work practice and by that cause friction against the situatedness of the context.

As pointed out there is still much to learn about the possibilities and effects of implementing the concepts produced in a co-creational workshop. The framework for analyzing the role of information technology in the concepts might be one step to better understand the differences in the concepts and by doing so work as a stepping stone for exploring how they can be implemented.

² The Health Avatar is a journal system which will enable easier communication between physicians and patients during the physical meeting. It visualizes the health of the patient. The patient will be able to see his or her journal, make appointments etcetera. The avatar will change appearance according to the health of the patient.

8. Conclusions and Future Research

In this thesis we aimed at understanding how information technology becomes part of the concepts coming out of a co-creational workshop. We also wanted to find a way of describing and categorize the results to better understand how well they stay aligned to their original practices.

What we found is that the results from this specific workshop can be categorized from their use of information technology in the concept produced. The use of technology is either implicit or explicit, indicating how visible, or not visible, the technology is in the concepts. This categorization showed to be useful as a way of dividing the concepts through the lens of bricolage as the implicit information technology use in the concepts indicated a bricolage-like use of technology which makes it well connected with its context and its original work practice.

We strongly believe that these concepts labeled as implicit and bricolage-like holds qualities that make them more likely to be integrated into existing practice in a more gentle way. It resembles change from within the practice providing the users with a sense of control and recognition. In comparison, a novel design from outside the practice would challenge the users in terms of forming new practices, new interpretations and meanings of what they are doing.

This is though only the beginning point of understanding this kind of workshop and co-creational concepts. There are many openings for further research to further explore the ideas we have suggested. To be able to conclude that this approach of bricolage-like concepts are more likely to integrate information technology into existing practice in a gentle way, it is important to follow a concept from idea to implementation. Is there any difference in solutions developed in co-creational activities in a bricolage-like way and more traditional approaches for developing systems and digital tools for this context?

We found the notions of implicit and explicit use of technology in the concepts as a powerful tool for analyzing the concepts but this framework would benefit from being tested on more results from other activities like this specific workshop.

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